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# Rethinking Brazil's Pantanal Wetland: Beyond Narrow Development and Conservation Debates

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## **Rethinking Brazil's Pantanal Wetland: Beyond Narrow Development and Conservation Debates**

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**Abstract:** The present study analyses the challenges related to the conservation of the South American Pantanal. It is focused on one of its most impacted areas, the Cuiabá River Basin. The research findings show a clear disconnect between the official assessment and the wider public perception of the processes that drive ecohydrological change. This partially explains the difficulty to implement environmental regulatory tools that conflict with the pre-existing foundations of conservation strategies promoted by public agencies. The most significant result of the research shows a lack of a shared understanding about who is responsible for environmental problems. The responsibility is largely obscure, indeterminate, it is typically related to someone else, the 'vague other' who hijacks the river from the rest of society, but can't be properly identified. This perception helps to conceal the underlying causes of environmental degradation and is limiting the possibilities for resolution. The present paper highlights the importance of accounting for a range of highly politicised issues at the intersection between interpersonal relations and broader socioeconomic pressures in a way that goes beyond the narrowly framed development and conservation debate.

**Keywords:** environmental conservation, regional development, agribusiness, wetlands, Pantanal, Brazil

### ***The Narrow Basis of the Conservation-Development Debate***

The Pantanal is one of the largest and most important tropical wetlands on the planet, as increasingly recognised in academic publications, international documents and government policies. It is located in the centre of the Upper Paraguay River Basin (UPRB) and has a total area of 147,574 km<sup>2</sup> shared between Bolivia, Brazil and Paraguay (ANA, 2005). The

Pantanal constitutes both a ‘biodiversity hotspot’ and a priority region for environmental conservation due to mounting threats caused by the expansion of agribusiness and engineering infrastructure (Olson and Dinerstein, 2002). Around 80% of the Pantanal wetland is within Brazilian borders, which has particularly suffered from the consequences of urban and agro-industrial expansion in areas higher than 200 m in altitude (the plateaus that surround the Pantanal), as well as from the intensification of mechanised agriculture and the use of chemical in the floodplain (da Silva and Girard, 2004). Changes in the plateaus and in the floodplain tend to reduce the variability in natural flow regimes and affect seasonal inundations (normally described as ‘flood pulse’), which are critical for the maintenance of wildlife in the Pantanal (Hamilton, 2002).

Accelerating rates of environmental degradation create a high level of uncertainty about the future of the Pantanal wetland system. The tension between available resources and mounting development pressures has led to recurrent calls for ecological conservation. At the same time, the management of ecosystems and natural resources is a matter of significant disagreement among social groups. The result is a situation with contradictory demands and reactive responses that are, at best, only marginally successful. Most of the conservation debate is still focused on a high-level description of problems that, in the end, fails to deal with the underlying socioecological complexity. The available interpretations concentrate on the disturbance of ecosystems, regulatory failures and lack of investments (see below), but it is rare to find critical analyses that connect conservation measures with personal subjectivities and sociospatial inequalities. What is worse: for the majority of politicians and policy-makers, conservation is typically seen as secondary to economic development in the whole region and agribusiness production in the plateaus.

The aim of this paper is to enrich the debate about conservation alternatives for the Pantanal by incorporating comments, reflections and expectations of different groups of

stakeholders. What follows is based on the results of qualitative fieldwork carried out in the Cuiabá River Basin, in the northern part of the Brazilian Pantanal (almost entirely within the State of Mato Grosso) which is one of the areas with considerable levels of socioeconomic activity and serious environmental risks. The analysis builds upon more than ten years of author's experience in project management and policy-making, which also included the coordination of an international scientific network and the production of two edited books on the Pantanal (Ioris, 2004; 2012). Although the empirical results provide only a snapshot of views and perceptions, these represent practical insights into the existing and future capacity to answer to emerging environmental conflicts. Before dealing with the specific circumstances of the Cuiabá River Basin, the next section will discuss the shortcomings of the mainstream conservation debate in the UPRB. That will be followed by the results and main findings of the case study in the catchment and, finally, by some general conclusions.

### ***Challenges Related to the Conservation of a Global Wetland of Local Importance***

The Pantanal is a wetland internationally famous for its lavish biodiversity, unique ecological features and cattle ranching traditions (Junk et al., 2011). The region has important economic activities, a strategic geopolitical location and abundant natural resources (land, water, minerals, biodiversity, etc.). As a result, the international community, including academics, diplomats and NGO activists, has emphasised the relevance of the Pantanal as a local wetland of global importance (often making reference to the Pantanal Matogrossense National Park, designated in 1981 and later declared a Ramsar site in 1993, and to the fact that the whole region was inscribed on the World Heritage List and designated a UNESCO Biosphere Reserve in the year 2000). However, the emphasis on the 'global importance' of the Pantanal has sometimes the perverse effect of concealing other aspects of its socioecology and the agency of local groups. There is a systematic failure to recognise the Pantanal as a global wetland of local importance, in other words, its geographical uniqueness should play a more

important role in the understanding of problems and in a more inclusive discussion about conservation priorities. The long-term prospects of the Pantanal, and of the entire UPRB for that matter, actually depend on this intricate dialectics between global and local, as much as between conservation and development. It is crucial to consider the many links within socioecological systems and with other external processes in order to inform governance institutions (Anderies et al., 2004).

One problem with the current debate is the prevalence of biological measurements and quantitative, analytical experiments, at the expense of interdisciplinary approaches that could more adequately address social and spatial tensions mediated, and configured, through the interaction between society and the rest of nature. For instance, the Pantanal Agriculture Research Centre (CPAP), based in Corumbá (the main urban centre in the Pantanal floodplain), has an impressive team of ecology researchers but only a handful of social sciences experts. Likewise, the most comprehensive assessment of the Brazilian Pantanal to date, the Conservation Plan of the Upper Paraguay River Basin (PCBAP), suffers from serious flaws that reflect the prevailing conservation rationale. PCBAP (1997) is a true ‘encyclopaedia’ of the Pantanal, a compilation of the best scientific information available at the time. In a series of volumes, it enlists environmental problems such as soil erosion (throughout the river basin and with particular severity in some specific locations), agriculture mechanisation (leading to soil degradation and sedimentation), pollution and devastation caused by gold diggers (*garimpo*), deforestation and inadequate use of soil (in farmland and in riparian areas) and the use of agriculture pesticides. Yet, the PCBAP is largely an over descriptive and fragmented document that soon after being published began to accumulate dust in the shelves of academics and policy-makers. A particular limitation of PCBAP is the persistence of the unresolved dilemma between environmental conservation

and economic growth in a context of growing pressures for production intensification and income generation.

Other publications have acknowledged the exuberant ecohydrology of the Pantanal, but did little more than registering the perceived main threats (i.e. water pollution, loss of biodiversity, mining, erosion and sedimentation, river regulation projects and modification of natural cycles) and superficially suggesting alternatives such as ecotourism, traditional cattle rising and the continuation of on-going projects (e.g. Cordeiro, 1999; Hamilton, 1999; Pott & Pott, 2004; Swarts, 2000). Similarly, Alho et al. (1988) express serious concerns over the removal of the native floodplain vegetation to make space for the introduction of artificial pastures, while Alho (2011) suggests that the main problems are deforestation, water pollution, uncontrolled infrastructure expansion, unregulated tourism and the introduction of exotic species, but very little is said about the socioeconomic disputes that underpin those trends. A series of studies commissioned by the Brazilian government, with international support, also aimed to ascertain the causal connections between problems and ecohydrological impacts (ANA, 2005), but the final product again fell short of considering the underlying causes and synergies between socioecological problems. Junk & Nunes de Cunha (2005) claim that low human population density and extensive cattle ranching in place since European colonisation had little environmental impact. For the last authors the Pantanal is essentially at a 'crossroads' due to mounting developmental pressures on ecosystem functions, which include the construction of roads and dams, as well as water pollution and overgrazing.

Despite the importance of those more recent analyses, major shortcomings persist in the understanding of intersectoral and multiscale connections that affect the conservation the Pantanal. It still remains a 'great divide' between social and biophysical theories, while there is a need for new methodological and interpretative approaches able to capture the full

socioecological basis of environmental problems (Goldman & Schurman, 2000).

Socioecological systems like the Pantanal need to be seen at the interface between global and local phenomena, where such multiscalar interconnections are a central feature of their vulnerability, resilience and adaptability (Young et al., 2006). The majority of the existing publications have paid limited attention to emerging disputes between urban and rural, old and new, landlords and employees, institutions and citizens regarding the access to natural resources and the asymmetric impacts of environmental degradation. The consequence is that policy-making has demonstrated an unwillingness to challenge conventional environmental regulation and fail to recognise the interlinkages between regional development and national and international economic failures. Coordination between government initiatives has been poor, with inadequate or partial geographical coverage, and has emphasised activities of low added value and high economic impact, such as farming, extractivism and mining (Tocantins et al., 2006). Also the new Forest Code approved by the National Congress in 2012 is expected to reduce the legal protection of riparian areas due to changes in the consideration of the water level of reference (Piedade et al., 2012). Similarly, the draft of a dedicated Pantanal Law (bill number as PL 750/2011), introduced in the Congress in 2011 by Senator Maggi, one of main leaders of the agribusiness sector, shows a distinct Malthusian bias when penalises, first of all, traditional communities living in the Pantanal.

There has been a recurring hesitation to tackle the internal contradictions of environmental policies and the politicised basis of environmental management responses. Most recent commentators ignore the demands of an increasing number of players, apart from the traditional cattle ranchers, miners and plantation farmers, involved in the disputes about the priorities of regional development, such as environmentalists, landless groups, family farmers, indigenous peoples, navigation companies, tourism operators and energy suppliers (i.e. natural gas from Bolivia to Brazil and hydropower dams being built at the transition



between the plateaus and the floodplain). That means neglecting that socioecological systems are inherently reflexive and that, because of this reflexivity, initiatives aimed at avoiding or mitigating environmental dangers can be found (Young et al., 2006). On the one hand, the focus on ecosystem-based approaches has become more evident as the integration of scientific knowledge is required for the development and application of public policies. On the other hand, there has been no appetite among politicians and policy-makers in the region to question the fast rate of agribusiness expansion (i.e. capital intensive, mechanised agricultural for commercial purposes) in the plateaus surrounding the floodplain.

The absence of more critical interpretations of the multiple interconnections between state, society and the rest of nature has led to a largely technocratic tone of conservation plans, which have reproduced a superficial understanding of the causes and consequences of environmental impacts. In the end, the strategies developed for the conservation of the Pantanal have operated within the same narrow episteme of regional development policies introduced in previous decades. There has been limited methodological and conceptual innovation and only a modest search for alternatives that are genuinely able to reconcile environmental conservation and the needs of the majority of the population. PCBAP (1997), for instance, includes mainly the outcomes of environmental disruption rather than dealing with the underlying drivers of socioecological changes and with the perpetuation of inequalities. Likewise, environmental regulatory reforms have been largely restricted to changes in the structure of government agencies and environmental legislation, but allocated an insufficient effort in terms of regulation enforcement and the democratisation of decision-making. Safford (2010) shows that, while the new water legislation delegated to catchment committees the approval of plans and the reconciliation of spatial differences, in practice there has been only partial regulatory enforcement and the maintenance of long established administrative procedures.

Although the sustainability of the Pantanal was incorporated into legislation, policies and official discourses, the crucial decisions about the economy, infrastructure and public services continue to follow the wider balance of power and, in particular, the hegemonic interests of the agribusiness sector. Even if announced by public agencies as something neutral and universally advantageous, contemporary environmental policies do not leave room for the long-term, politicised interactions between different social groups mediated by the access to (the rest of) nature (Ioris, 2010). Instead of promoting a genuine change in public policies, prevailing approaches have largely preserved the interests of landowners, industrialists, construction companies and real estate investors, at the expense of the majority of the population and the recovery of ecological systems. For instance, there is a repeated attempt to associate public-private partnerships with novel responses to environmental degradation. TNC-WWF (2011: 13) specifically endorse the role of financial institutions “to incorporate environmentally sustainable requirements” when extending credit to agriculture and cattle ranching in the Pantanal. Those new tendencies raise serious questions about the legitimacy of the more recent policies and programmes formulated for the region, especially because they reproduce the same pattern of unequal, short-term results of traditional development (see the case study below). That is a clear demonstration of what Büscher et al. (2012) call ‘neoliberal conservation functions’ that serve to further entrain nature to capitalism and to create broader economic possibilities for capitalist expansion.

The problem is not simply the lack of legal structures and institutions aimed at limiting the environmental impacts of rapid development and land use change (i.e. there are actually more than 120 laws on environmental issues connected to the Pantanal and its surrounding areas alone, as discussed by Charnoz, 2010), but environmental degradation systematically replicates the politics of regional development. If a violation is detected, it is often not enforced, the penalty is not large enough to act as a deterrent against non-

compliance or there are cases of corruption involving law enforcers and environmental aggressors (Meio Ambiente Agora, 2011). The old plan to extend the Paraguay-Parana Waterway (*hidrovia*) also illustrates the difficulty to go beyond the narrow basis of the conservation-development debate (Gottgens, 2000; Gottgens et al., 2001). The project was shelved in 1998 but then brought back to public attention after its inclusion in the Programme for the Acceleration of Growth (PAC), the national agenda of investment by the Brazilian government launched in 2007. However, the debate between agribusiness, river engineers and environmentalists has largely ignored the needs of the riparian communities living along the Paraguay River, which are increasingly sceptical of initiatives that in the end reinforce patterns of social inequality and environmental degradation (Borges et al., 2000). An emerging threat is the aggressive expansion of hydropower generation, which has become one of the main environmental pressures on the Pantanal, particularly due to the growing demand for energy in the industrial areas of Brazil. The increase of hydropower (around 140 new hydropower schemes are under construction or being planned in the Brazilian side of the UPRB), together with the large areas with sugarcane (to produce ethanol), accentuates the tensions between contrasting scales of the environmental agendas, in this case the reduction of greenhouse gas emissions to cope with climate change and the local impacts caused by dams and intense farming.

The above publications and projects reveal the difficulty to reconcile the global importance of the Pantanal and the promotion of concrete action measures. The biased interventions of the state apparatus, including the work of environmental regulatory agencies, have primarily supported the expansion of urban growth and agribusiness activities. The impacts of socioeconomic growth in and around the Pantanal floodplain in recent decades – mainly associated with the export of agriculture commodities – can only be addressed with responses that are largely beyond the existing scientific approaches and the commitments of

existing policy-making frameworks. Scientific and regulatory uncertainties have not been helped by the lack of integration between researchers and academic communities, but there are more basic questions still to be addressed. There is a pressing need to unpack the underlying barriers to an effective conservation of the Pantanal, which calls for a broader consideration of the connections between governmental, sectoral and interpersonal synergies. In that context, the alteration of river basins, like the Cuiabá River, represents a telling example of socioecological changes, environmental degradation and lasting inequalities in the Pantanal region.

### ***The Cuiabá River Basin as a Microcosm of Pantanal's Conservation Dilemmas***

This section presents the results of the case study in the Cuiabá River Basin, which is one of the largest, most populated and extensively impacted catchments in the UPRB. The local experience is highly illustrative of the contemporary conservation challenges and serves as an entry point into the wider – and necessarily more complex – questions of socioeconomic development in the UPRB. The river basin has an area of 28,732 km<sup>2</sup> that can be schematically divided into three main sections: the plateaus with intensive plantation farming, the medium section around the city of Cuiabá (the capital of Mato Grosso) and the Pantanal floodplain (Figure 1). Annual average temperature is 26.8°C and average precipitation between 1,700 (in the headwaters) and 1,300 (in the floodplain); average river flow oscillates between 300 and 350 m<sup>3</sup>/s (data from the Federal University of Mato Grosso - UFMT). It is beyond the scope of this article to describe in detail the Cuiabá River Basin, but specific information about the river basin and the Pantanal at large can be found, among others, in Ecoplan (2003), Figueiredo (2009), Zeilhofer et al. (2010), Junk et al. (2011) and Ioris (2012).

The river basin is shared by 14 local authorities and has a population of around one million with an urbanisation rate of 93% (Ecoplan, 2003). Investments in water services have

lagged behind the rate of urban growth and only 30% of the urban sewage is collected and treated (Sanecap, 2011). At the time of the research there was an expectation of additional funds to prepare the city for the 2014 World Football Cup, but evidences of widespread corruption seriously affected the construction timetable. As a result, the river system, which has historically been one of the main recreation options for the locals, was then banned by the municipalities downstream of the city of Cuiabá due to the increasing contamination by faecal coliforms and other forms of pollution (Figueiredo, 2009). In addition, a large hydropower scheme – the Manson dam – entered into operation in 1999 and impounds water of the Rivers Manso and Casca, tributaries of the main Cuiabá River. This complex combination between long established uses of the river and new management approaches provided the context and the justification for the analysis of the underlying barriers to environmental conservation.

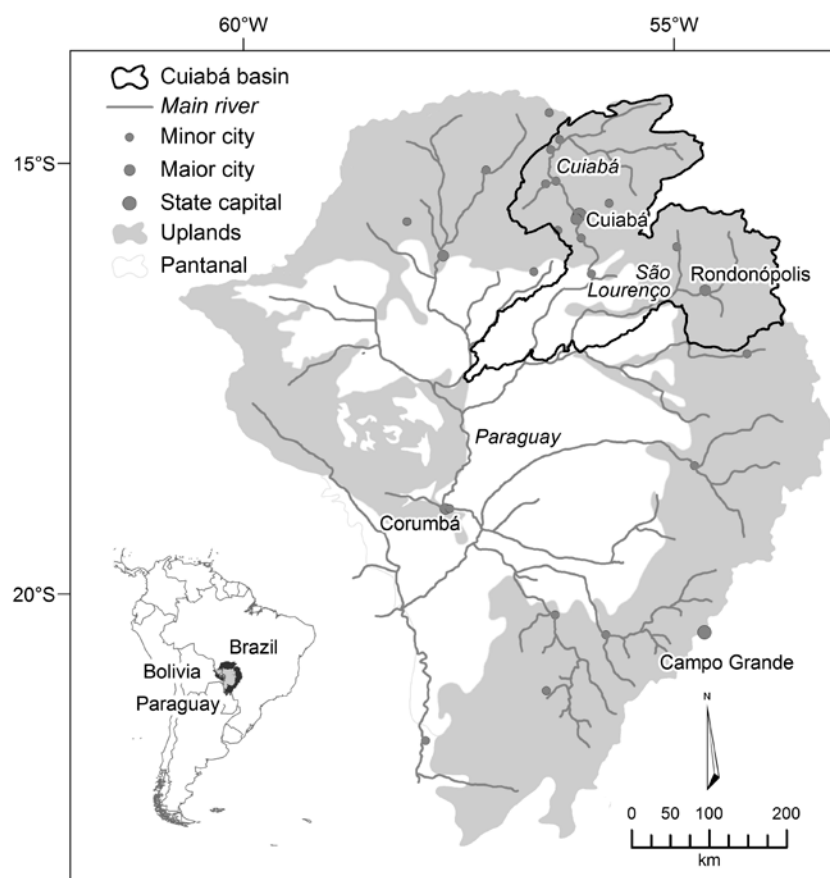


Figure 1: Map of the UPRB, the Pantanal and the Cuiabá River Basin

## Methodological Approach and Research Findings

The research consisted of an exploratory study designed to capture and compare underlying values, perceptions and expectations about the future. Different than most existing assessments mentioned above, the current analysis employed a bottom-up approach. The methodology combined interviews, participant observation during site visits and the attendance of public events for a period of eight months in 2011. The overall purpose was to determine how the local knowledge is constructed and comprehend the different views about pressures affecting the Pantanal and the Cuiabá River Basin in particular. An initial list of stakeholders was selected in different places along the Cuiabá River, based on the suggestions made by local academics at UFMT. Further contacts were identified following a snowball approach (Bernard, 2002) where respondents gradually provided the names and contact information for other social actors (Babbie, 2001) living in the same locality. Interviews (35 in total) were conducted in two fieldwork campaigns: 18 in March and 17 interviews between May and July. The basic criteria to plan the interviews were to include locations upstream and downstream to the city of Cuiabá, as well as the metropolitan area, in order to incorporate as many stakeholder sectors as possible, particularly those not usually included in the formal decision-making process. Stakeholders from the following sectors were contacted: a) professional fishermen, b) cattle farmers and representatives of the farming sector, c) water utility officers, d) park rangers, environmental officers and environmental guides, e) recreational fishermen, f) manufacturing industries, g) owners of restaurants and tourism agencies, and h) public authorities and legislators. Interviews were semi-structured and included questions defined in the earlier phases and informed by the available academic and non-academic literature.

The study followed an interactive strategy that tried to compose a synthesis of multifarious processes associated with water use and environmental management in a specific geographical context. According to the inductive nature of the research, explanation was neither objective nor neutral, but intrinsically connected to the personal experience of the researcher and, therefore, the interpretation of processes under consideration. Instead of pre-determined hypothesis, the study focused on research questions that allowed the interviewees to provide in-depth responses and make subjective assessments. A set of ten open-ended questions were used in the interviews in order to encourage the participants to shape their own narratives of the lived experience in the river basin, their understanding of problems and demands in terms of environmental restoration and conservation. To allow for depth, nuance and to acquire information on its natural form, the interviews (which lasted around one hour each) were made face-to-face, taped, transcribed and analysed making use of the NVIVO software.

For the use of NVIVO, seven main nodes and 25 sub-nodes were determined based on the interview questions and on a preliminary assessment of the interview transcripts; once the nodes and sub-nodes were available, the full text of the transcripts were analysed and comparable answers and claims were grouped accordingly. Table 1 has a summary of the main interview themes (converted into main NVIVO nodes) and the proportion of their appearance in interview transcripts. Interview transcripts were analysed in Portuguese and only the extracts reproduced in this paper were translated into English. Please note that it will be presented here the most relevant, instructive findings of the research concerning environmental conservation and management. The empirical results – considering the association of nodes and sub-nodes – suggest that the three main obstacles of environmental conservation in the Cuiabá River Basin are the conflicting perception of problems, the rigid

formulation of responses and the vague responsibility for environmental degradation, which will be discussed next.

Table 1. Key Themes and Insights from the Interviews	
Key themes (i.e. NVIVO nodes)	Proportion in the interview transcripts
Critique of environmental problems	19.6%
Demands of public services	10.9%
Environmental values	6.5%
Details of water uses	13.0%
Disputes and conflicts	15.2%
Collaboration and alliances	8.7%
Public policies and politics	26.1%

### Conflicting Perceptions of Socioecological Trends

One of the main objectives of the research project was to contrast the opinion of different social groups with scientific publications and the rationale of public policies. Academic and governmental documents vaguely acknowledge the trend of alterations, especially those associated with fast urbanisation in the middle stretches of the river and agribusiness and dam construction in the upstream section (Mato Grosso, 2009). Such pressures are described as disrupting the ecohydrology of the river and aggravated by overfishing and deforestation. Water quality surveillance is carried out by the state environmental protection agency (SEMA), basically making use of methodologies developed in northern countries and adjusted to the condition of tropical catchments. Nonetheless, the official monitoring network has still limited statistical evidence of environmental degradation and water pollution. Out of the only 15 sampling points used by SEMA along the Cuiabá River, water quality is



classified as good in the majority of points during most of the year; water quality deteriorates to a medium condition in certain months due to lower oxygen, higher concentration of coliforms and some other pollutants from urban and rural diffuse sources (see more details in SEMA, 2010). There is better evidence of water quality degradation only in the area in and around the city of Cuiabá, where the river is significantly impacted by the lack of sanitation infrastructure, the connection with the storm water system and the expansion of impervious surfaces (Zeilhofer et al., 2010).

It is well known by the local academics and policy-makers that the coverage and frequency of water quality monitoring in the Cuiabá River Basin is far from the level recommended for large tropical catchments. What is less often discussed is that the process of environmental change has not been equally perceived, and acted upon, by different communities and social groups. The empirical results of the current study revealed a surprising, and growing, disparity in the understandings and in the reactions to the poor environmental condition of the catchment. More importantly, there was a noticeable mismatch between the reaction of most of interview respondents and the water quality problems recorded by the monitoring agency (obviously it is the latter, instead of the former, that inform the management procedures adopted by environmental regulators). Especially the population living close to the river or with some regular contact with the water system sustain a more negative impression about the biochemical deterioration than the picture described in official reports. But all respondents who took part in the research expressed strong views about the trend of impacts and complained about what they see as an accelerating environmental degradation and the inadequacy of most public policies, for example: “The main problem is the apparent lack of public policies dedicated to the conservation and preservation of the river. [We need] more focused and effective policies” (interview, resident of Santo Antônio do Leverger).

When asked whether water could be consumed directly from the river, almost all respondents categorically refused to contemplate the idea of drinking untreated water, which is a vivid indication of the underlying perception of the status of the river system, as is illustrated by the following quotation:

“I would not drink. Because we notice, when we collect some water on a jar, that is no longer just water, it is something cloudy, murky. There is so much left in the water. Water is no longer as it used to be. It is a different type of water. (...) Nowadays we use it to wash something, but never to drink. Before we use we boil it. But we no longer drink water from the Cuiabá River. Especially in the dry season [middle of the year], when the river is low, we see very clearly the pollution as a white grease.” (interview, fisherman, São Gonçalo Beira Rio community)

This gap between scientific and non-scientific assessments of water quality is not a trivial difference between expert and lay interpretations. On the contrary, it exposes a considerable distance between the official treatment of risks and uncertainties and the wider social perception of the processes of change affecting the river system. Although the public is unable to quantify the alteration in numeric terms, in their opinion and based on their lived experiences the river is increasingly becoming more degraded. Instead of dissimilar discourses, these represent entirely different ‘grammars’ of environmental conservation used by social groups and organisations. It is a diversity of environmental ‘grammars’ in the sense that each one denotes specific symbols, values and attitudes towards the environment. Distinct environmental ‘grammars’ are demonstrated by the contrast between, for example, the discourse of cattle ranchers, industrialist and hydropower operators, on the one hand, and fisherman, riparian communities and low income residents, on the other. The plurality of environmental ‘grammars’ found in the Cuiabá River Basin actually serves as a representative example of the confusion about the conservation and management of the Pantanal at large. The contrasting opinions about the status of the catchment are held according to the ability to influence policy-making and regional development. ‘Grammars’ are not only dissimilar, but reflect a whole hierarchy of power that underpins the various

claims about the river system. The interrelationship between knowledge and power is evident in the ‘grammar’ used by the stronger water users (public and private), who feel powerful enough to defy both public criticism and scientific advice (i.e. stronger economic groups are normally associated with sectors that significantly alter the river system, such as agriculture, mining and industrial production, and who systematically strive to contain the economic impact of a more stringent environmental regulation).

The construction and operation of the Manso Hydropower Scheme provides a clear demonstration of conflicting ‘environmental grammars’ underpinning perceptions and reactions to environmental change. The initial environmental statement identified a range of likely environmental impacts and included 21 monitoring and mitigation programmes, such as hydrological, limnological and water quality surveys (details are available in FURNAS, 2012). However, since the construction of the dam, mounting environmental problems have been denounced by riparian residents, but systematically disputed by the hydropower operator FURNAS. The very enforcement of the environmental regulation by the environment protection agency (SEMA) has been problematic and resisted by the managers of the hydroelectric scheme. Lenient regulation has not been helped by the fact that FURNAS is an agency of the federal government (i.e. formally beyond the remit of SEMA) and the enhancement of electricity supply is one of the key infrastructure priorities of national development policies. At the same time that this controversy about the primary regulatory responsibility remains unsettled, almost all individuals interviewed during the research expressed substantial reservations about the Manso dam and what they perceive as significant changes in the season flow regime and the associated decline of fish populations. Many respondents affirmed that the river flow is now disturbingly different than used to be in the recent past:

“What we can clearly see is that water has reduced due to the existence of Manso today. The river used to ‘come’ up to the top of the riverbank in periods of heavy rain. But now it only reaches a certain point, never overflows the riverbank. (...) And the quality is also different; here in our community we don’t even enter into the water.” (interview, artisan, São Gonçalo Beira Rio community)

In the end, there exists an uncomfortable anxiety among many sectors of the local society about indeterminate, but palpable, water quality and water quantity alterations. The public may be unable to measure the level of environmental risk, but they are convinced that the river has been affected by the urban expansion and economic activity in the catchment. Those concerns are intermingled with a sense of nostalgia about the past condition of the Cuiabá river system in previous decades. A perverse consequence of the overall ambiguity about the changes happening to the catchment is the alienation, and even exclusion, of traditional water users from the actual management of the river system. The population shows little tolerance with a situation that is seen by many, even in an imprecise way, as unfair restrictions to the access and use of the river. In the interviews, some respondents related the growing rate of environmental impacts in the catchment with what they perceive as a condition of serious inequality in terms of the access to the river and a sustained disregard of their ‘lay’ opinions. For instance, professional fishermen complained about what they see as the privatisation of the margins of the river by restaurants and hotels, which introduce fishnets and other physical structures to contain the fish only for their own interests. That was vehemently criticised as an unjust practice that further reduces the income of an activity already struggling to survive in the Cuiabá River Basin. While the water quality seems to be deteriorating fast and affecting many social groups, wealthier people are allowed to build large mansions (normally without proper planning permission) along the riverbanks:

“There should be a more stringent control of activities in the catchment. If you take a boat and travel down the river you will see such magnificent houses, including some that belong to wealthy judges [a profession normally associated with a privileged social status in Brazil], who even build little weirs in front of their houses. These people, instead of giving a good example, they think they can do whatever they want.” (interview, community leader, de Nossa Senhora da Guia association)

The series of cleavages in the discussion about the actual condition of the river and the future of the catchment serve to reinforce an overall situation of environmental degradation and sociospatial inequalities. On the one hand, there are calls for action by governmental and non-governmental organisations for dealing with an indeterminate, but clearly uncomfortable, situation. On the other hand, there is a persistent difficulty among the general public to connect causes and effects, which is further encouraged by hesitant scientific assessments and the sociopolitical commitments of the state. That ends up producing a sort of ‘conservation paralysis’, that is, a major difficulty to put in practice legal requirements and public policy goals. Habermas (1987) makes reference to the inherent dialectic of modernisation as the burdens placed on the internal structures of the lifeworld by growing system complexity. This well known tension of European modernity continues to operate in areas recently incorporated into the globalisation of markets, as in the case of agribusiness intensification and mass commodity consumption such as the Cuiabá River Basin. It is important to realise that such dialectic of modernisation functions not only at the macro level of regional development and formal arenas of political disputes but also through the intricacies and non-linearities of everyday life and interpersonal dealings. The convergence between wider system complexity and the everyday lifeworld has significant repercussions for the comprehension and management of environmental processes, which leads us to the next main shortcoming of environmental conservation.

#### Pre-Given Responses to (Uncertain) Socioecological Problems

There are main consequences of the persistent disregard for what is considered an emotional, misinformed reaction of the local population to the environmental problems of Cuiabá catchment (as discussed in the preceding section). First, the conflict between the official discourse and a myriad of public opinion on different issues has resulted in the lack of

environmental conservation leadership, particularly by the state water agency (SEMA) and the Mato Grosso water council (CEHIDRO). Second, there is a related difficulty to put into practice the growing number of legal norms and environmental regulatory tools. Our empirical results suggest that the persistent difficulty to advance environmental regulation derives primarily from the external, pre-given foundations of most contemporary conservation strategies. Formal environmental rules has expanded significantly in the last two decades, but the core elements of the new legislation – such as environmental impact assessment, user permits and charges, and the payment for ecosystem services – have more to do with the circumstances in the south-eastern parts of the country than with the particular geography of the Pantanal region (or the Amazon and the Cerrado, for that matter). The Mato Grosso water law, for example, follows the tenets of the national water law (both were passed in the same year 1997) and the two incorporated the international doctrine of integrated catchment management, techno-economic instruments of regulation and representation in catchment committees (Ioris, 2009).

The new water legislation is centred on the need to pay for the extraction of water from the environment (in order to increase use efficiency), as well as on the formation of river basin committees (supposed to be in charge of resolving water conflicts). Yet, those instruments seem largely inappropriate for a situation where most forms of water use are not consumptive (i.e. the number of water users that abstract water from the river, such industries and irrigation farms, is very low in the Cuiabá catchment) and the water management controversies are beyond the remit of state authorities (as in the aforementioned case of the Manso dam). The result is that both water charges and the committee are still not operational and have restricted prospects to derive actual socioecological benefits to the catchment. One important reason for the still inexistence of the river basin committee is the enduring dispute between the Government of Mato Grosso and the National Water Authority (ANA) about the

legal responsibility for the catchment (i.e. formally, it is a federal river basin but in effect its almost entirely contained in the State of Mato Grosso).

It was specifically mentioned in some interviews that adjustments in the organisation of public agencies and in the institutional arrangements have not corresponded to the mounting environmental management problems in the Cuiabá River Basin. On the contrary, the prevailing public perception is that the responses of government agencies have been limited, tardy and given rise to populism. Most initiatives fail to encompass the geographical particularities of the catchment in favour of targets and objectives that are only partially connected to the wider universe of public opinions and the intricacies of local socioeconomic activities. In that sense, the lack of scientific data and the difficulty to comprehend the complexity of the river basin (repeatedly mentioned in publications like Alho, 2011; Galdino et al., 2006; Lourival et al., 2008; Swarts, 2000) becomes a convenient excuse for policy-makers and scientists to avoid difficult questions about the soundness of natural resources management and environmental conservation frameworks.

In a context of generic, pre-given answers to idiosyncratic socioecological problems, other forms of community initiatives and grassroots organisation tend to be regularly ignored. In the same way that unofficial information about the river is disregarded by the formal environmental regulatory machine, bottom-up reactions to environmental problems are unapproved and unsupported by decision-makers, as reflected in the following statement:

“Look, there are lots of those available [public policies], but the problem is that they don’t work. Lots of policies, but they are beyond what we need. The solutions don’t move [things] forward, while the problems keep mounting. (...) I believe that it is a clear lack of political willingness, because one has to incorporate different variables, work with several aspects simultaneously, but the government has no interest in doing that.” (interview, NGO member)

The difficulty to engage with the public reveals a great deal about the weaknesses of environmental regulation in a situation of fast-expanding regional development. The conversion of the original landscape of the Cuiabá River Basin into plantation farms and the

intensification in the use of natural resources constitute the prevailing vectors of economic growth and, as a result, there is limited political will to adopt any environmental regulation measures that seriously clashes with those hegemonic interests (as demonstrated by the introduction of the bill PL 750/2011 mentioned above). The same government that is responsible for environmental conservation and scientific research is simultaneously the main promoter, and beneficiary, of such conservative model of economic development that takes place in the upland areas surrounding the Pantanal, where agribusiness and intensive agro-industry have appropriated large extensions of land and resources. Instead of an internal coherence and good coordination between scales of government, the state apparatus is permeable and especially susceptible to the influences of the most powerful social groups (Ioris, 2010). And it is also evident that the environmental branch of Mato Grosso government (i.e. SEMA) is one of the politically weaker and less important divisions of the state apparatus.

Interestingly, although the primary commitment of the Mato Grosso government remains the expansion of crop production, the social imaginary of the Pantanal – populated by colourful images of birds, fish and water – has been consistently appropriated by politicians as supposed evidence of their environmental credentials. The fact that it is still possible to find in the Pantanal ecosystems still relatively well preserved (what is the result mainly of the difficult access to most of the floodplain rather than the consequence of conservation initiatives) effectively operates as an element of the legitimisation of hegemonic development policies. As much as the symbolism of the Pantanal operates as the ‘moral reserve’ of public authorities in charge of environmental conservation, it is also constantly emphasised as one of the priority regions for the expansion of tourism and ecotourism in Mato Grosso (Figure 2). However, in our interviews the local population and their leaders resented the uncontrolled growth of tourism in the Pantanal floodplain and along the rivers of



the Cuiabá River Basin that are tolerated or stimulated by the State government. For instance, the mayor of the town of Barão de Melgaço expressed his frustration with the construction of a paved road to his municipality, which provided easy access to sport fishermen (blamed for additional environmental degradation and for bringing virtually no income to the local markets, as they arrive with their own equipment and provisions) without the necessary control by environmental authorities. The ordinary blaming of ‘other’ people and other social groups has more than trivial repercussions, but constitutes another serious barrier to environmental conservation, as discussed below.

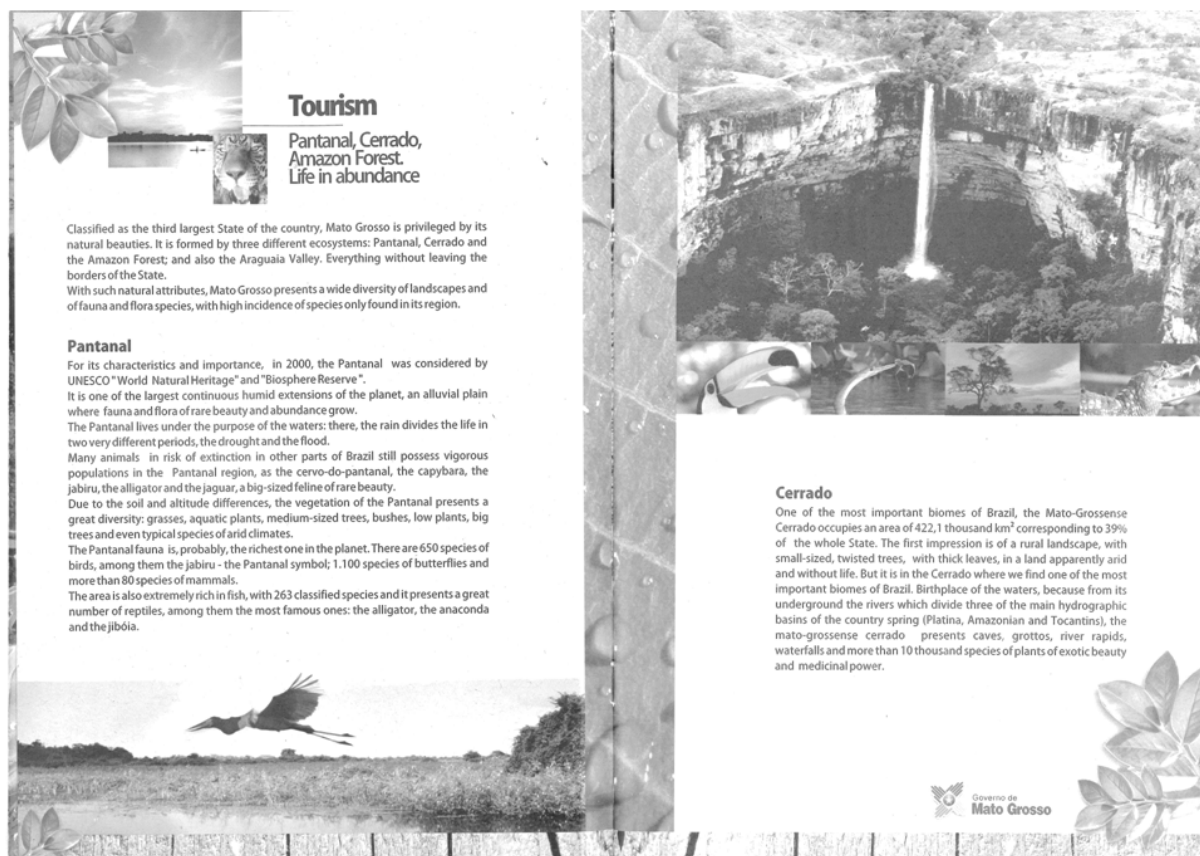


Figure 2: Leaflet by the Mato Grosso State Government associating nature with tourism

### The Responsibility of the ‘Vague Other’

Probably one of the most significant results of the research was the uncertain reference, in various interviews, to the responsibilities for environmental problems. Whilst there is a

generalised perception that something is badly wrong with the management of the river basin, there is a great difficulty to locate blame for the growing rate of environmental impacts. Most interviewees seemed convinced that the environmental problems are growing at a fast rate, the liability is placed at an undefined ‘other’, a fluid entity that is essentially a hazy combination of governmental agencies, public authorities and certain members of the public. The responsibility is largely obscure, indeterminate, it is typically related to someone else, the ‘vague other’. This imprecise ‘other’ is someone who, because of his/her/its faults hijacks the river from the rest of society, but can’t be properly identified, as demonstrated in the following interview extracts:

“I believe that the pollution in our Cuiabá [River] is the people themselves. I mean... how I could say, people in general, you know... Those who throw rubbish in the water, and many other things, also in the tributaries [of the main river], like in the Coxipó River. (...) In the rainy season, with all that rubbish, you can easily see the amount of fish, little fish, dying because of the water, you know.” (interview, fisherman 1, São Gonçalo Beira Rio community)

“There is a clear lack of conscience; people should stop throwing waste in the river. Sometimes we go and collect the rubbish along the riverbank and the quantity is not small...” (interview, community leader, de Nossa Senhora da Guia association)

“All the fishermen plan it, we go downriver and clear the riverbanks, but it is not enough, because we do it and other fail to protect [the river].” (interview, fisherman 2, São Gonçalo Beira Rio community)

“Look, up to ten, I would give a mark of two, because there is no way we can use the water from the river anymore. Only to water some plants, that is the maximum we do nowadays. (interview, restaurant owner).

“In my opinion, there is a lack of no scruple among the public, these are things that should never happen. Forty years ago nobody had any preoccupation with the environment, everything was fine. Environmental awareness is something too recent in Mato Grosso, very new indeed. What is missing is the public to take action and fight for some improvement.” (interview, tourism agent)

That may sound as an irrelevant question of misinformation, but there are important social factors that may lead individuals to project the responsibility of solving environmental problems on vaguely defined ‘others’. First of all, it is an integral part of the wider problem of the disregard and alienation of riparian communities by other urban and rural groups. It is

also an indicator of the distant, problematic relation between residents and their ecosystems under lifestyle changes mediated by mass consumption, mass waste and the monetisation of everything. Another dimension of the same problem is the difficulty to relate the deterioration of the Cuiabá River with the failure of other governmental interventions, such as inadequate urban planning, deficient public transport and the submission to the strong interest of agro-industrial sectors. All those factors are then translated into a sense of powerlessness, as if the only thing left was to imprecisely blame someone else.

Together with the romanticism of the past condition of the catchment, the public struggles to make sense of the changing condition of the river and the actual responsibilities for environmental problems. The ‘vague other’ is also a manifestation of the weakness of the democratic institutions, so far as the general population is continuously relegated to a paternalistic relation with the public authorities. Hence the nebulous blaming and the ambiguous expectation that the government agencies should do ‘something’ about the river system. Such disparity between rising concerns over environmental degradation and a range of undetermined responsibilities is neither easily acknowledged in the environmental conservation discourse (which is typically focused on the consequences of environmental disruption and fails to establish a consistent connection with the basis of socioeconomic development), nor in most political ecology literature (which usually criticises the negative consequences of economic development without necessarily addressing personal and interpersonal processes). If the other is everybody, in practice it becomes nobody. That leaves a subtle sense of noneness, an uncomfortable feeling of helplessness or nowhere to go. It creates a distressing chain of “otherness-noneness-nothingness” that ends up concealing and even reinforcing the overall process of environmental degradation (i.e. consciously or unconsciously, it supports the rationale that ‘if nobody is doing anything, so it is not my obligation to do anything either’). This vicious circle of vague otherness and no responsibility

is more serious than the commonly described NIMBY phenomenon ('not in my backyard', or the opposition by residents to proposals or initiatives close to them, although generally needed in the society).

The general uncertainty about environmental trends and regulatory responses reflects the wider context of political demobilisation and civil society disorganisation in the Cuiabá River Basin. The local experience has shown that it is easier to contain public criticism and divert attention away from the mounting environmental problems if and when the liability is not clearly understood. Environmental injustice goes beyond the asymmetric distribution of opportunities and negative impacts, but it is also a manifestation of the hierarchical and discriminatory treatment of popular demands and the paternalistic interaction with the population. Furthermore, the combination of the previous two processes (i.e. contrasting perceptions of the catchment condition and the imposition of pre-given solutions) with the 'vague otherness' produce a widespread pessimism about the future of the river and its ecological status. As observed by some local residents:

"Unfortunately, everything seems to be worsening: and what is worse, I can't see a good future [for the river]. I can't notice any improvement. If you go and check on GoogleMaps, the deforestation in the catchment is growing and this is one of the critical problems. The tendency is only to go downhill." (interview, fisherman, Nossa Senhora da Guia community)

"It is a calamity to pay R\$ 5.00 [US\$ 2.50] for a large bottle of [mineral] water. (...) In remote areas we still have protected springs and there are wells with good water quality. But in thirty years, I believe that there will not be good water even to have a shower, for our personal hygiene. That is because of the unchecked development and lack of sanitation inspection." (interview, restaurant worker)

That sense of pessimism is constantly nourished by reports about the environmental degradation of the catchment that are disseminated by the mass media without a proper discussion of causes, consequences and responsibilities. An emblematic demonstration of the useless pessimism about the Cuiabá River was the comparison, in several interviews, with the Tietê River, which crosses the City of São Paulo and is famously one of the most polluted water bodies in the country:

“I don’t believe that we could fish in the future in the Cuiabá River. I know the entire river, almost the whole Pantanal and I know how it is. You asked me about the changes in the last twenty years, but I want to answer that in the next thirty years we will have nothing left. I am convinced that we will only have a new Tietê here in Mato Grosso.” (interview, fisherman, Z1 association)

### *Lessons Learned and the Prospects for the Pantanal*

The paper briefly discussed the results of a research carried out in the Cuiabá River Basin, which provides an entry point into understanding the wider complexity of the challenges facing the Pantanal wetland. The main objective of the study was to investigate the connections between personal perception, public policies and future expectations about the environmental condition of the river basin. The initial review of the academic and grey literature on the Pantanal exposed the narrowly defined concerns of the existing public policies favouring a diversity of social groups, conflicting political interests and supporting the legacy of past economic development. The conventional analyses of problems remain persistently superficial in terms of connecting the politico-economic basis of agribusiness and fast urbanisation with long-term environmental risks. In that politico-institutional context, the specific case study on the Cuiabá identified three main issues, which are relevant not only for the conservation of the Pantanal and tropical wetlands but for environmental management in general: 1) the conflicting assessment of environmental problems and the contrasting perception of different social groups about who is to blame for them; 2) the inadequacy of existing policy responses imported from geographically different regions; and 3) the uncertain and vague allocation of responsibilities that happens through an unfortunate chain of “otherness-noneness-nothingness”.

Overall, it was possible to clearly identify a widespread sense of uneasiness with both the condition of the Cuiabá River Basin and with what is seen as the inadequate responses of public agencies. The fact that the public normally holds opinions that contrast with the official discourse and the interests of strong stakeholder groups represents a major difficulty

for the enforcement of regulation as well as for and the mobilisation of society. In addition, despite the existence of relatively comprehensive environmental legislation (such as of the 1997 Water Law), the introduction and enforcement of environmental regulation have happened through a patchwork of measures that often are not consistent with each other and fail to lead to results in line with scientific claims, popular knowledge, and the formal objectives defined for the Pantanal by government agencies. Finally, it was somehow surprising that the population both expressed discomfort with the performance of public agencies and persistently struggled to allocate and take personal responsibilities for the condition of the catchment. The responsibility is normally transferred to a ‘vague other’, someone distant and indeterminate.

Although not often recognised as such, those three synergic problems certainly represent challenging obstacles for the conservation of the river basin and the Pantanal and, what is more important, operate as a tacit justification of perverse economic development trends. The ultimate conclusion is that effective environmental protection of the Pantanal can only result if a critique of hegemonic socioeconomic policies is productively connected with the complex perceptions and processes that determine personal behaviours and interpersonal exchanges. There is a crucial association between different scales of socioecological interaction – the national and regional with the local and personal – but it is still rare to notice its proper consideration in the conservation debate about the future of the Pantanal. However, such multiscalar and highly politicised interactions cannot and should not be any longer ignored.

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